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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/502,071

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Dennis W. Prather

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WASHINGTON, DC 20036

EXAMINER

WOOD, KEVIN S

ART UNIT

PAPER NUMBER

2874

MAIL DATE

DELIVERY MODE

08/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/502,071

Applicant(s)

PRATHER ET AL.

Examiner

Kevin S. Wood

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2007.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-41 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This action is responsive to the Amendment filed on 3 May 2007. Claims 1, 8, 15, 22, 29, 30, 32, 33, 35, 36, 38 and 39 have been amended. No new claims have been added and none of the claims have been canceled by this amendment. Claims 1-41 are pending within the application.

Response to Arguments

2. Applicant's arguments filed 3 May 2007 have been fully considered but they are not persuasive. The examiner has thoroughly reviewed the applicant's arguments, however the examiner feels the cited references reasonably and properly meet the claimed limitations.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

The lack of any specific argument pointing out the novelty of the current invention in view of the cited prior art may be held to be not fully responsive and a time period set to furnish a proper reply if the statutory period has expired or almost expired (MPEP § 714.03). However, in this instance, the claims as amended are clearly open to rejection on grounds of record, a final rejection is being made in compliance with MPEP § 714.04.

The Applicant's arguments consist of a general statement that the prior art reference(s) do not disclose all of the claimed limitations of each claim. The applicant fails to point out any specific limitation(s) which the prior art does not meet. It is unclear which limitation the applicant believes that the prior art fails to teach.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-29, 31, 32, 34, 35, 37, 38, 40, and 41 are rejected under 35 U.S.C. 102(b/e) as being anticipated by U.S. Patent Application No. 2002/0021878 to Allan et al.

Regarding claims 1, 8, 15, and 22, Allan et al. US 2002/0021878 A1 teaches (Fig. 25, [0064]) an electro optic switch (and inherent method of using same) comprising: a non-piezoelectric photonic crystal material having first 170 and second 172 waveguides provided therein, wherein the first waveguide is adjacent to the second waveguide along a coupling length, and a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides for electro-

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optic switching between the first and second waveguides (see [0064]), which clearly, fully meets Applicant's claimed limitations. The photonic crystal waveguide structure has a photonic bandgap (see ABS). The Allan et al. reference clearly discloses that the first 170 and second 172 waveguides are located within the same plane. The Allan et al. reference also discloses that the first 173 and second 174 controllable regions, which may be made of electro-optic polymer slabs, are contiguous with each of the respective first 170 and second 172 waveguides. If the controllable (switching) regions are contiguous with the waveguides, then they are considered to be within the same plane as well.

Regarding claims 2, 3, 9, 10, 16, 17, 23, and 24, photonic crystal square and hexagonal lattices are disclosed ([0007]-[0010]).

Regarding claims 4-7, 11-14, 18-21, and 25-28, the propagation constants of the 1st and 2n~ waveguides are equivalent and couple to each other all optical wavelengths in the symmetrical arrangements as shown in Fig. 25 ([0064]).

Regarding claims 29, 32, 35, 38, injection of current is disclosed ([0018]), which inherently has charge "carriers".

Regarding claims 31, 34, 37, and 40, the control of Allan et al. '878 serves to modulate the coupling of the device.

Regarding claim 41, the optical absorption coefficient will inherently change when the device of Allan et al. '878 is electrically controlled to actuate an optical switching function.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 30, 33, 36, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application No. 2002/0021878 to Allan et al. in view of U.S. Patent Application No. 2002/0101895 to Augusto.

The Allan et al. reference teaches (Fig. 25, [0064]) an electro-optic switch (and inherent method of using same) comprising: a non-piezoelectric photonic crystal material having first 170 and second 172 waveguides provided therein, wherein the first waveguide is adjacent to the second waveguide along a coupling length, and a change in conductance along the coupling length resulting from an electro-optic effect in the coupling length provides for electro-optic switching between the first and second waveguides (see [0064]). The Allan et al. reference clearly discloses that the first 170 and second 172 waveguides are located within the same plane. The Allan et al. reference also discloses that the first 173 and second 174 controllable regions, which may be made of electro-optic polymer slabs, are contiguous with each of the respective first 170 and second 172 waveguides. If the controllable (switching) regions are contiguous with the waveguides, then they are considered to be within the same plane as well. Allan et al. '878 does not explicitly teach the change in conductance is optically induced by electron-hole pair generation (claims 30, 33, 36, and 39).

Augusto US 2002/0101895 A1 teaches electro-optical switching device using photonic crystals in which electron hole pairs are generated in the photonic crystal material to inherently change properties of the photonic bandgap with a change in conductance, in order to inherently modify such property.

Since Allan et al. '878 and Augusto '895 are both from the same field of endeavor, the purpose disclosed by Augusto '895 would have been recognized in the pertinent prior art of Allan et al. '878.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to recognize that changing conductance along a coupling length by electron hole generation would have been an obvious modification of the prior art to Allan et al. '878, for the purpose of efficiently controlling the conduction band in the photonic crystal structure.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin S. Wood whose telephone number is (571) 272-2364. The examiner can normally be reached on Monday-Thursday (7am - 5:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KSW



KEVIN WOOD
PRIMARY PATENT EXAMINER